

CLAIMS

What is Claimed is:

1. A system for implementing a data storage quota comprising:
 - 5 a computer system including a plurality of data storage devices and an authentication mechanism, said authentication mechanism having a plurality of unique identifiers and authorizing a plurality of users based upon at least one of said plurality of unique identifiers;
 - a user group comprising a first set of users from said plurality of users,
 - 10 each of said first set of users having a first identifier of said plurality of unique identifiers,
 - a hierarchic computer file system organized on top of at least one of said plurality of data storage devices, said hierarchic computer file system comprising a plurality of files, a plurality of parameters and a plurality of directories, said plurality of files arranging into a plurality of trees and having a second identifier from said plurality
 - 15 of unique identifiers, said plurality of parameters describing a plurality of qualitative characteristics of a level of consumption of a plurality of file system resources by said plurality of users and user group;
 - a quota system coupled to said hierarchic computer file system, said quota system determining a used quantitative parameter of file resource consumption
 - 20 that is associated with said plurality of files and can identify for at least one of said plurality of users a total value of a set of quantitative parameters of file resource consumption;
 - wherein said set of said quantitative parameters of file resource consumption are marked by a set of third identifiers of said plurality of unique identifiers
 - 25 coupled to said used quantitative parameter of file resource consumption and other quota parameters of said used quantitative parameter of file resource consumption.

2. The system of Claim 1, wherein said hierarchic computer file system can have a hidden root directory that is not visible to said plurality of users.

3. The system of Claim 1, wherein said second identifier acts as an attribute to denote belonging to at least one of said plurality of users and said user group.

5 4. The system of Claim 1, wherein said hierarchic computer file system further comprises a specific data storage space mounted to an available directory area, said specific data storage area comprising a second computer file system.

10 5. The system of Claim 4, wherein said second computer file system is mounted inside said available directory of said hierarchic computer file system, wherein after said second computer file system is mounted, said computer system has an opportunity to use said second computer file system as an extension of said hierarchic computer file system.

15 6. The system of Claim 4, wherein after said second computer file system is mounted, said second computer file system becomes a part of a new tree of said hierarchic computer file system.

20 7. The system of Claim 1, wherein said plurality of directories and said available directory act as a plurality of mounting points of said hierarchic computer file system, wherein said plurality of mounting points are located inside said hierarchic computer file system, and wherein said plurality of mounting points are utilized by a plurality of mounting objects.

25 8. The system of Claim 6, wherein said plurality of mounting objects comprise a plurality of file system volumes and a plurality of file system sub-trees.

9. The system of Claim 1, wherein said plurality of unique identifiers can be within a context of an operating system.

10. The system of Claim 9, further comprising a computer network connected with said computer system and wherein said context of said operating system comprises a set of identifiers unique in said computer network.

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11. The system of Claim 9, wherein said context of said operating system comprises a set of identifiers unique on said computer system.

12. The system of Claim 9, wherein said context of said operating system
10 comprises a set of identifiers unique to an allocated area of said computer system.

13. The system of Claim 12, wherein said allocated area comprises a chroot environment.

14. The system of Claim 12, wherein said allocated area comprises a virtual
15 environment.

15. The system of Claim 1, wherein said plurality of parameters of said
hierarchic computer file system comprises at least one of a consumption parameter on
20 a size of at least one of said plurality of data storage devices associated with at least
one of said plurality of users and said user group, a consumption parameter on a
number of various auxiliary file system structures used to arrange files of at least one of
said plurality of users and said user group, a consumption parameter on other
parameters of auxiliary operations performed by an operating system to serve at least
25 one of said plurality of users and said user group during a period of time, and a
consumption parameter on a time and range of modifications of any of said above
consumption parameters that allow a user to modify already defined limitations.

16. The system of Claim 1, wherein said quota system can operate with said hierarchic computer file system and does not require modification of a manner in which data and file metadata are represented in said hierarchic computer file system, as well as a way of representing file system service data in said at least one of said plurality of data storage devices organized below said hierarchic computer file system.

17. A method for implementing a data storage quota comprising:

- authorizing a plurality of users within a computer system with a plurality of unique identifiers of any context of an operating system;
- grouping a first set of users of said plurality of users in a user group, each
- 5 of said first set of users having at least one of said plurality of unique identifiers;
- organizing a hierarchic computer file system on top of a data storage device, wherein said hierarchic computer file system comprises a plurality of files, a plurality of parameters and a plurality of directories;
- arranging said plurality of files into a plurality of trees, wherein each
- 10 said plurality of files has at least one of said plurality of unique identifiers to act as an attribute which denotes belonging to at least one of said plurality of users and said user group;
- describing qualitative characteristics of a level of consumption of a plurality of resources of said hierarchic computer file system by at least one of said
- 15 plurality of users and said user group via said plurality parameters of said hierarchic computer file system;
- mounting a specific data storage area as a second file system inside any available directory of said hierarchic computer file system, wherein after said mounting of said specific data storage area said computer system can use said second file
- 20 system as an extension of a new tree of said hierarchic computer file system;
- calculating a used quantitative parameter of file resource consumption associated with said plurality of files; and
- telling at least one of said plurality of users a total value of a set of quantitative parameters of file resource consumption using said used quantitative
- 25 parameter of file resource consumption.

18. The method of Claim 17, wherein said calculating step further comprises:
coupling a set of identifiers from said plurality of unique identifiers to said
used quantitative parameter of file resource consumption; and

5 marking said set of quantitative parameters of file resource consumption
with said set of identifiers from said plurality of unique identifiers and other quota
parameters of said used quantitative parameter of file resource consumption,

19. The method of Claim 17, wherein a set directories within said plurality of
directories comprises a plurality of mounting points of said hierarchic computer file
10 system, wherein said plurality of mounting points are located inside said hierarchic
computer file system, and wherein a file system volume and a file system sub-tree can
each be used as a mounting object for said plurality of mounting points.

20. The method of Claim 17, wherein said calculating step further comprises:
defining a calculation area of an occupied space as a sub-tree of said
hierarchic computer file system located on a search path below any of said plurality of
directories;

5 using an algorithm to analyze a full access path to at least one of said
plurality of files and to define belonging of said at least one file to said calculation area,
wherein said belonging to said area is defined by a presence of an address of any one
of said plurality of directories that starts from a directory root in said full access path;

associating at least one of said plurality of files with at least one of said
10 plurality of unique identifiers for identifying at least one of said plurality of users and said
user group via a usage of information stored in said hierarchic computer file system as
information about file ownership;

using one of a special file, a data storage area, a computer operating
memory and a special server that stores and updates data comprising one of a current
15 size of an occupied space and a quantitative parameter of file resource consumption
that is associated with at least one of said unique identifiers;

serving a plurality of operating services via one of a special program of
said operating system and a kernel of said operating system, said plurality of operating
services comprising a plurality of requests for data allocation in at least one of said
20 storage devices and a plurality of answers of said plurality of requests about sizes of
allowed and currently occupied area of said data storage devices by a user associated
with at least one of said plurality of unique identifiers;

using one of said special file, said data storage area, said computer
operating memory and said special network server by at least one of said special
25 program and said operating system kernel; and

defining an opportunity to reserve space for user data identified by at least
of one of said plurality of identifiers via a usage of one of said special file, said data
storage area, said computer operating memory and said special network server by at
least one of said operating system services.

21. The method of Claim 20, wherein said calculating step further comprises:
initializing at least one of said special file, said data storage area, said
computer operating memory and said special server for storage and update of
5 information about current size of said used quantitative parameter of file resource
consumption that defines initial values for a plurality of usage parameters of a data
storage space for at least one of said plurality of unique identifiers associated with an
area of said used quantitative parameter of file resource consumption;
setting up values of usage limits of data storage space for at least one of
10 said plurality of users and said user group; and
tracking of alteration quantitative characteristics of a resource
consumption level.

22. The method of Claim 21, wherein said serving said plurality of operating
15 services uses a plurality of defined parameters from said plurality of parameters of said
hierarchic computer file system and wherein said plurality of defined parameters are
used to manage an allocation of a data storage area within said hierarchic computer file
system.

20 23. The method of Claim 20, wherein said calculating step further comprises:
releasing an allocated area size and a plurality of other data storage
parameters; and
modifying said allocated area size and said plurality of other data storage
parameters;
25 wherein said releasing and modifying steps are performed by at least one
of said special program of said operating system and said operating system kernel.

24. The method of Claim 17, wherein said calculating step further comprises:
releasing an allocated area size and a plurality of other data storage
parameters; and

5 modifying said allocated area size and said plurality of other data storage
parameters.

25. The method of Claim 24, wherein said releasing and modifying step
comprises:

10 defining a belonging of said used quantitative parameter of file resource
consumption to at least one of said plurality of files of said hierarchic computer file
system;

determining a belonging of an area of said used quantitative parameter of
file resource consumption;

15 determining at least one of said plurality of unique identifiers;

detecting a plurality of current values of said plurality of parameters;

identifying a plurality of limitations associated with said plurality of
parameters based on at least one of said plurality of users and said user group;

20 updating in at least one of a special file, a data storage area, and a
computer operating memory, and a special server of said detected current values and
said identified limitations;

comparing said identified limitations with a current value of a storage
usage, a current state of said computer system, a current state of said hierarchic
computer file system and a requested size for an allocated space and other parameters
of data storage; and

25 determining a permission to a required operation of said computer system
based on said comparing step and an execution of said required operation.

26. The method of Claim 25, wherein said releasing and modifying steps are performed by at least one of a special program of said operating system and a kernel of said operating system.

5 27. The method of Claim 17, wherein said plurality of parameters of said hierarchic computer file system comprises at least one of a consumption parameter on a size of at least one of said plurality of data storage devices associated with at least one of said plurality of users and said user group, a consumption parameter on a number of various auxiliary file system structures used to arrange files of at least one of
10 said plurality of users and said user group, a consumption parameter on other parameters of auxiliary operations performed by an operating system to serve at least one of said plurality of users and said user group during a period of time, and a consumption parameter on a time and range of modifications of any of said above consumption parameters that allows for use by a user to modify already defined
15 limitations.

 28. The method of Claim 17, said calculating step can operate on top of said hierarchic computer file system and does not require modification of any manner in which data and file metadata are represented, as well as any way file system service
20 data is represented in said storage device of said hierarchic computer file system.

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